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Manpower in the U.S.S.R.

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Extracts from an address by [redacted], Assistant Director, Central Intelligence Agency, before the President's Committee on Scientists and Engineers, October 4, 1957.

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[redacted] said that he would begin by reviewing the essential facts of the situation. There has not been anything radically new in the estimates of overall Soviet scientific manpower, but in reference, it would probably be useful first to present, very quickly, the available material. (Here

[redacted] showed graphic slides of (1) Soviet and U.S. graduates per year in all scientific fields; (2) Soviet and U.S. graduates per year in physical sciences and engineering.) Russia is turning out more college graduates in science per year than the U.S. As of 1957, we believe that the Russians have about 1,500,000 in all the various scientific disciplines. The comparable U.S. figure for mid-1957 is 1,300,000. The Russian figure comprises:

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885,000 in the physical sciences and engineering
 215,000 in the agricultural sciences; and
 380,000 in the health sciences.

We have a much larger proportion in the health sciences than the Russians.

The Russians are ahead in terms of total scientific and technical professional manpower. If these trends continue, the situation will get worse before it gets better. In this day and age, unfortunately, this is a consideration which can't be neglected.

The educational system in Russia is an excellent one for production of good, competent engineering and scientific personnel. This is particularly true insofar as the high school level is concerned--in the early stages they do everything they can in order to get pupils properly trained and interested.

The economic reorganization recently undertaken in Russia has, to date, had no obvious effect on the educational system. If anything, it might still further improve the system, at least indirectly. The reorganization is essentially one of decentralization. This will mean that the quality of research will be much evener across the country as a whole and this will be reflected in the quality of education received by people in remote areas. As a result better trained people will become more generally available. At present there is a considerable variation in quality with the big universities turning out superior people.

Other recent changes in educational system are increased emphasis during the past few years on practical training and more attempts to interest students in putting theory into practice. At the high school level, shop training is being increased; better equipment is being provided; more field trips to industry are being made so that students may see the practical applications of the things they are studying.

This emphasis on the practical might possibly be considered a weakening of their educational system. On the other hand, it is not being done at the expense of basic science training. It is being done in addition to it. However, literature, history, etc., are being weakened as a result. Physics, mathematics and basic sciences are still being taught at the same pace.

Higher educational system. Science and technology are taught in 3 main types of Russian higher educational institutions: (1) engineering or technical colleges; (2) polytechnic institutes (advanced engineering); (3) universities giving broad training in basic sciences.

25X1A9a (Here slides were shown to illustrate the size of the Moscow University and the high quality of equipment used in chemical engineering laboratories. [redacted] said that this equipment compares favorably with that used in American universities and that some equipment excels ours.)

In the past, 10-year schooling was considered as college preparatory training. Now, with the increasing universality of the 10-year high school education for all students, the Russians are turning out more graduates than they can handle in the higher educational system. They are, therefore, making an effort to train these 10-year people so that they can go out and take jobs right away. They are also urging high school students who are eligible for higher education to work 2 years in an industry prior to entering higher schools. This has the additional advantage of giving students in the higher educational institutions a greater maturity and a better feeling for the application of the principles they are learning in the classroom. This is a significant change from the pattern of a few years ago.

There has been a great increase in the extension training--about 30% of all students enrolled in engineering courses in Russia are actually extension students. This is the way in which they are getting additional people trained despite limited facilities.

In the past, there was an over-degree of specialization. The Russians are making efforts to broaden the base of engineering students so that they are in a position to move from one field to another without too much difficulty. Several measures are being introduced to bring about such broadening; narrow specialties are being combined; authors of textbooks are no longer being paid by the page but by the book to obviate padding with irrelevant detail; and research in higher schools is being expanded and oriented towards wide problems of value to the national economy. The last mentioned change (aside from the scientific advantages that may result) will afford engineering students greater opportunities for independent work and will encourage them to do more original thinking than before.

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The satellite countries participate fairly actively in the Russian education program. Approximately 16,000 Chinese and other foreign students are studying in Russia. (A recent report on foreign students coming to this country gives a figure of approximately 12,000.) About 200 Russians are students in satellite countries. The Russians have set up a Joint Nuclear Research Institute at Dubna near Moscow making the research and training facilities available to scientists from the satellite countries. The satellite countries represented at the institute must contribute financially to its support and their scientists are not too pleased with this since they feel that it makes them dependent on the Russian system and less able to do their own research.

The Russians have an active program of technical aid to other countries. They are establishing a technical institute at Bombay and plan to send 18 professors to this institute as well as bringing Indians to Russia. There are plans for an institute at Rangoon with a capacity of 1,000 students and staffed with Russian-trained teachers, but the plans are not progressing as rapidly as had been expected.

The Chinese Communists are making efforts to accelerate the training of engineers and scientists. It is extremely difficult for them because of the limited number of people who can teach.

The quality of work being done by the Russians can be evaluated from the increasing number of contacts of U.S. scientists with the Russians. In the electronics field, visitors from Russia have come to this country and four of our industrial companies sent research people to Russia to visit their establishments and talk with Russian scientists. Our people have come back with an evaluation of their work. For instance, we might believe that TV is a field of U.S. dominance, but in Moscow alone there are 2 million TV sets. This compares favorably with the situation in this country. The Russian sets are of high quality; their components are superior to those of our sets. Actual picture performance is better in Russian sets. However, the cost is considerably higher in Russia. In the last year there has been an attempt to bring down costs and the Russians have cut down on the refinements, but these were non-essentials, such as the cabinet, and not things that count. They have maintained the high quality of their sets. Our visitors were also impressed by Russian research and the quality of their work in color TV.

Approximately 600,000 technicians, and scientists and engineers are now working in the civilian electronics industry in Russia compared with 700,000 in this country. We thought we were superior in this field. Also, bear in mind that this figure is only in the Russian civilian field--not the military.

Dr. Piret of the University of Minnesota, who went to Russia in connection with a peat research project, was impressed by the research going on there and thought it was greater than what we are doing in coal, for instance. He was tremendously impressed by the large numbers and the high quality of the work and training going on in chemical engineering fields. In the three chemical engineering institutes he visited there are more than 10,000 students taking chemical engineering. He was impressed by the numbers and thoroughness of the work going on.

These visitors are, of course, being given only the best but we can't afford to be complacent about this, as our visitors have been impressed by what they saw in so many different fields.

In agriculture, Russia is about 20 years behind the U.S. People, however, are again being trained in the sound fundamentals and are now working along proper lines. 25X1A9a

25X1A9a [redacted] said that [redacted] and he attended a meeting about 9 months ago of people who had been to Russia for a conference on high energy physics. There was almost universal agreement that they were making tremendous progress in this field. They are definitely second only to the U.S. and if they keep up their present effort they might pass us in this field in the near future. They are, for instance, working on accelerators which have no counterpart in this country.

On the military side of the picture; there is no question that they are moving forward by leaps and bounds. In the electronics field they have a tremendous program for satisfying major military requirements. They have a good radar system. Rumor has it that the Russian communications system in the Antarctic is so superior that the U.S. expedition has used it on occasion to send messages. In the atomic energy program, nuclear tests are being conducted on a large scale. In the past month they have been conducting two atomic test series simultaneously at great distances apart which means they have enough people and equipment to handle two tests at once. As for their guided missiles program, they have, of course, announced that they had fired an ICBM in August; we know they have capacity to fire such a test vehicle if they want. This program has a high priority and they are putting forth tremendous efforts. We know they could have fired it but cannot prove whether they did or not.

There has been publicity about the Russian earth satellite. They won't announce anything until they have it up there. It wouldn't surprise us if such an announcement came at any time. We must be prepared for it. They are capable of doing these things. (Asked whether they are more capable than we are, Dr. Scoville replied that they are not more capable but probably more determined.) They can direct their efforts wherever they want to. (The announcement of the launching of an earth satellite weighing about 180 pounds shortly after the time of this presentation is graphic proof of what they can accomplish if they set minds to a scientific or military venture.)

To summarize, the Russians have a very large number of scientific and engineering people and their educational system is good. However, particularly at the lower levels, they may suppress initiative. This is a quality we would do well to stress in our system as it may offset some of the other Soviet advantages. There is no question but that the Soviets are capable of great accomplishments both in peacetime and wartime. In view of the dynamic drive of their entire scientific program, we must expect further revolutionary developments in addition to the first satellite launching.

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25X1A9a During the ensuing discussion, [REDACTED] said that the figures he quoted were based on comparable definitions. The engineering figures, for example, represent graduates of the five-year engineering course in Russia.

It was agreed that the Russians can utilize all the scientists they are producing.

25X1A9a [REDACTED] said they hope to make the 10-year high school system universal by 1960.

25X1A9a Asked whether the Russians are accomplishing as much as we are in their engineering courses, [REDACTED] mentioned the faculty ratio--there is an overall average of 12-13 students per faculty member and in some institutions better than that. This compares with the usual American ratio but not, for example, with MIT. The ratio in the 10-year high school course, according to [REDACTED] (who accompanied [REDACTED]), is kept at 30 or below per faculty member. They are experimenting with new teaching techniques. Dr. [REDACTED] said that they use a lot of visual aids but he was not sure about TV.

25X1A9a [REDACTED] was also asked whether anybody really got below the surface when visiting Russia. He replied that they had been able to see students in action and to talk to students. Some visitors attended lectures and were impressed by the degree of student participation in courses.

25X1A9a Asked whether there were any data on Russian efforts in educational research, [REDACTED] replied that they publish magazines in Russia containing articles along these lines.